FIVE NEW SPECIES OF *APTENOCANTHON* MATTHEWS (COLEOPTERA: SCARABAEIDAE: SCARABAEINAE) FROM TROPICAL AUSTRALIA, WITH NOTES ON DISTRIBUTION

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Storey, R.I. & Monteith, G.B. 2000 12 31: Five new species of *Aptenocanthon* Matthews (Coleoptera: Scarabaeidae: Scarabaeinae) from tropical Australia, with notes on distribution. *Memoirs of the Queensland Museum* **46**(1): 349-358. Brisbane. ISSN 0079-8835.

Five new species of the flightless scarabaeine genus *Aptenocanthon* Matthews are described from northern Australia: *jimara* sp. nov. from the Northern Territory; *kabura* sp. nov., *wollumbin* sp. nov., *wingar* sp. nov. and *speewah* sp. nov. from mountains in the wet tropics of northern Queensland. A key is given to the eight species in the genus. *A. jimara* is the first record of the genus away from the east coast. Biology and distribution are discussed. ❐ *Coleoptera, Scarabaeidae, Scarabaeinae, Aptenocanthon, dung beetles, taxonomy, rainforest, flightless.*

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Matthews (1974) erected *Aptenocanthon* to contain two small, flightless, canthonine dung beetles from mountain rainforests in central, coastal New South Wales, namely *A. hopsoni* (Carter) from the Barrington Tops region and *A. rossi* Matthews from the Blue Mountains. The distributional dimension of the genus was expanded radically with the later discovery of *A. monteithi* Storey on the summit of the highest mountains in tropical Australia, in the Wet Tropics region of northern Queensland, almost 2,000km north of the NSW species (Storey, 1984). Subsequently, intensive surveys of all the mountain systems in the Wet Tropics by the Queensland Museum, have revealed another 4 new species, all with allopatric distributions on other high altitude mountain ranges. In addition, an undescribed species has been located in the ANIC collection from lowland, monsoonal rainforest in the Northern Territory.

When Storey described *A. monteithi* he noted that it deviated from the generic definition in several ways. There is also considerable morphological diversity among the new species described here, and some of them further extend the accepted concept of *Aptenocanthon*. However, they all share a similar body form, and for those where males are known, all have a similar form of the fore tibial apex with its inner angle expanded and bearing a short brush of stiff setae bent downwards at right angles to the upper tibial surface. A proper assessment of the status of these putative species of *Aptenocanthon* should include a comprehensive consideration of related genera in the mentophiline section as defined by Matthews (1974). Since such studies are in progress, at several levels, by other workers, this paper simply names and diagnoses these species to place them on record as part of the recently discovered mountain diversity of the Wet Tropics.

METHODS AND MATERIALS

Terminology and format for descriptions are similar to those used by Storey (1984). The use of the term 'hypomeral stria' follows that of Reid & Storey (2000) for *Temnoplectron* Westwood.

The following abbreviations for collections are used: ANIC, Australian National Insect Collection, Canberra, Australia; HAHC, H. & A. Howden Collection, Ottawa, Ontario, Canada; QM, Queensland Museum, Brisbane, Australia; QPIM, Department of Primary Industries, Mareeba, Qld, Australia. Collectors are abbreviated as follows: DC, D.J. Cook; GM, G.B. Monteith; SM, S.R. Monteith; GT, G.I. Thompson; HJ, H.A. Janetzki; SH, S. Hamlet; DY, D.K. Yeates; PB, P. Bouchard.

SCARABAEIDAE
SCARABAEINAE
SCARABAEINI
CANTHONINA

Aptenocanthon Matthews

Aptenocanthon Matthews 1974: 93.

TYPE SPECIES. *Panelus hopsoni* Carter, 1936 by original designation.

KEY TO SPECIES OF *APTENOCANTHON*

1. Ventral aspect of prothorax with a short hypomeral stria on each side extending forward a short distance from the hind margin towards the femoral depressions and parallel to the pronotal margin 2

   Ventral aspect of prothorax without such hypomeral striae; north Queensland 6

2. Dorsal surface of head with distinct recurved setae; epipleural line strongly carinate; pygidium with large circular punctures; Northern Territory . . *jimara* sp. nov.

   Dorsal surface of head glabrous; epipleural line not strongly carinate; pygidium without circular punctures; eastern Australia 3

3. Pygidium with a deep transverse groove across upper margin, terminating in a pit at each end; pseudepipleural margin not carinate, broadly rounded; north Queensland . . . . . *speewah* sp. nov.

   Pygidial groove, if present, not terminating in pits at each end; pseudepipleural margin usually carinate 4

4. Pseudepipleura of elytra each with 2 distinct short striae; dorsal part of eye very short, wider than long; north Queensland . . . . . *wollumbin* sp. nov.

   Pseudepipleura of elytra each with 1 distinct stria; dorsal part of eye longer than wide; NSW 5

5. Elytra with intervals flat, glabrous; lateral pseudipipleural margins sharply defined basally; outer edge of epipleura strongly sinuate . . . *hopsoni* (Carter)

   Elytral with intervals convex, densely setose; lateral pseudepipleural margins not carinate, broadly rounded; epipleura normal . . . . . *rossi* Matthews

6. Pygidium with a distinct groove along its basal edge; elytral striae strongly impressed and catenulate . . . . . *kaburo* sp. nov.

   Pygidium uniformly convex, without grooves; elytral striae weakly impressed, not catenulate 7

7. Striae on dorsal surface of elytra fine but distinct, each with small punctures present; intervals slightly convex; larger species, length > 5mm . . . . . *winyar* sp. nov.

   Striae on dorsal surface of elytra almost effaced, impunctate; intervals flat; smaller species, length < 5mm . . . . . *monteithi* Storey

Aptenocanthon jimara sp. nov.
(Figs 1, 2E, 6A)

MATERIAL. HOLOTYPE: ♀, Northern Territory, 12°47'S 132°51'E, Baroalba Spring, 20.xi.72, R.W. Taylor, rainforest, berlesate. ANIC 470 (in ANIC).

DESCRIPTION. *Female*. Total length 3.5mm; maximum width 2.7mm; colour brown, edges of elytra a little lighter, antennae yellow.

Head. Clypeal teeth small, shallow, with broad U-shaped excavation between; rest of margin feebly convex to the obtuse, indistinct genae; anterior edge indistinctly margined. Dorsal surface subnitid, reticulate near clypeal apex, moderately punctate, each puncture separated by about half a diameter; punctures each with a short anteriorly directed seta; a circular marking near the inner apex of each eye, about the size of dorsal portion of eye, nitid, impunctate. Dorsal portion of eyes small, about 5 facet rows in width, separated by about 8 eye widths; canthus incomplete. Apical segment of labial palpi small, narrow about one-third length of second segment.

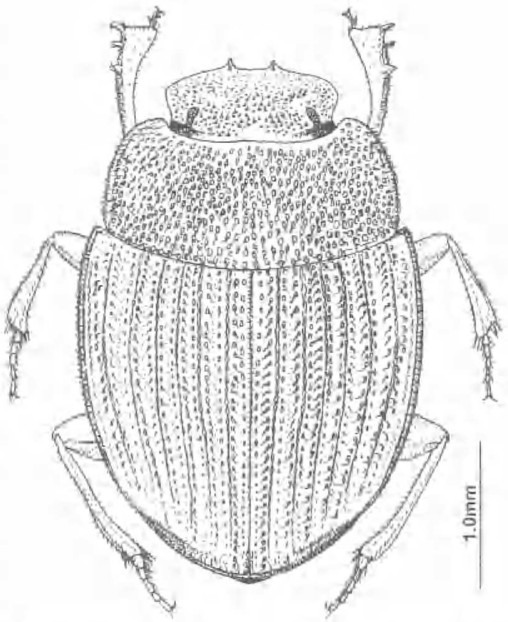

FIG. 1. *Aptenocanthon jimara*, ♀ holotype, dorsal view.

Pronotum. Surface slightly flattened, about 2.3 times as wide as long. Anterior angles quadrate, apices acute; lateral angles broadly obtuse, rounded; posterior angles obtuse. Anterior edge finely margined on lateral one-third only; posterior edge not margined; lateral edge with narrowly doubled margin from lateral angles to posterior angles. Surface nitid with large ocellate punctures each separated by less than one diameter, most with a short recurved seta.

Elytron. Striae shallow, narrow, crenulate, punctures not discernible. Intervals nitid, convex in centre, with large ocellate punctures along margins next to striae; each puncture with a short seta recurving towards centre of interval. Dorsal surface with 7 striae (seventh visible in basal one-third), strongly deflexed outside seventh stria to form a pseudepipleuron which is carinate and distinct for about four-fifths length of elytron. Pseudepipleuron with 2 distinct striae and possibly a third next to margin with epipleuron; epipleural border strongly carinate.

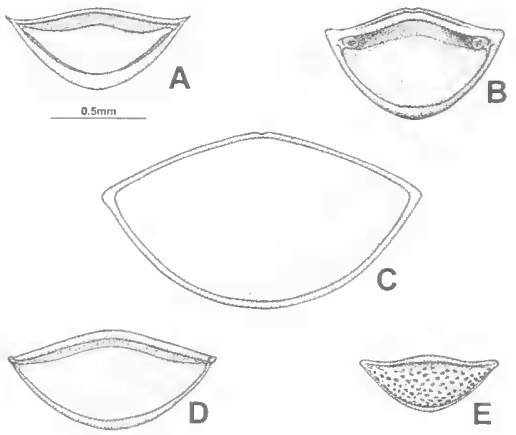

FIG. 2. *Aptenocanthon* spp., pygidium. A, *kabura* sp. nov.; B, *speewah* sp. nov.; C, *winyar* sp. nov.; D, *woolumbin* sp. nov.; E, *jimara* sp. nov.

Distinct setate punctures on pseudepipleural surface, not ocellate; setae shorter than on dorsal surface. Epipleuron wide at base, narrowing gradually towards apex, a little depressed at level of metatibia; surface reticulate, with large shallow punctures and fine indistinct setae.

Pygidium. Broad, apex rounded, with basal groove distinct on central one-half only, surface with medium-sized punctures, each with a fine seta.

Venter. Ventral surface of pronotum with hypomeral striae distinct, extending from posterior edge to about one-half distance to anterior femoral depressions; surface with medium-sized punctures each with a short seta. Mesosternum short. Meso- and metasternum nitid, subnitid laterally on metasternum, with numerous ocellate punctures each with a short seta, punctures and setae stronger posteriorly. Sternites finely reticulate, visible segments 2-5 with a row of medium-size punctures along anterior edge, and along posterior edge laterally; segment 6 with similar punctures over entire surface; punctures with short, fine setae.

Legs. Fore tibiae with inner apical spur short, acute, ventral surface of femur with dense medium-size punctures with short recurved setae. Mesofemur nitid with small punctures each with a fine seta. Metafemora with numerous punctures each with a fine seta.

Male. Not known.

REMARKS. The unique holotype is from leaf litter in a remnant rainforest patch fed by a permanent spring system a little to the east of Nourlangie Rock in Kakadu National Park. This is the only known occurrence of the genus away from the east coast of the continent. The species can be easily recognized by the obvious dorsal setae on head and elytra, the distinct hypomeral carina on the ventral side of the pronotum, and the presence of 6 visible sternites on the abdomen. It has some resemblance to a small species of *Tesserodon* Hope, and its generic placement should be regarded as provisional. The specific name is an Aboriginal word for hair.

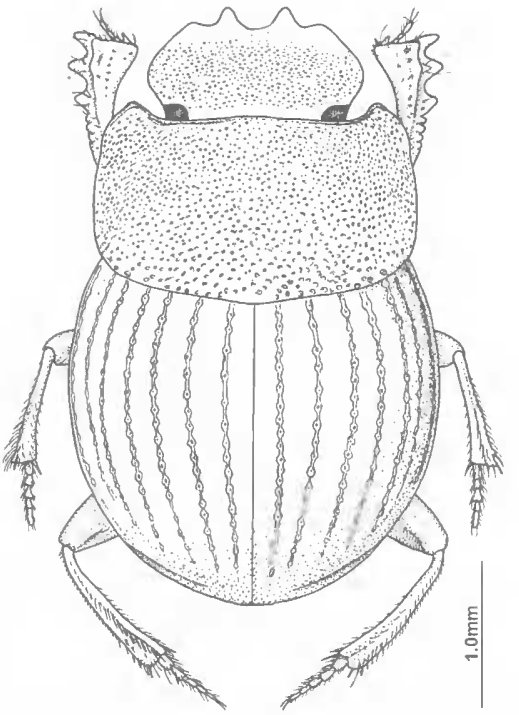

FIG. 3. *Aptenocanthon kabura*, ♀ holotype, dorsal view.

Aptenocanthon kabura sp. nov.
(Figs 2A, 3, 6B, 8)

MATERIAL. HOLOTYPE: ♀, QMT54702, Qld, Mt Finnigan summit, via Helenvale, 3-5.xii.1990, D. Cook, G. Thompson & L. Roberts, 1050 m, pitfall traps. In QM; Paratype: ♀, same locality, 19-22.iv.1982, GM, DY & DC, rainforest pitfall trap (ANIC Data No 25 017214). In QPIM.

DESCRIPTION. *Female.* Total length 3.8mm; maximum width 2.5mm; colour black except head, legs, abdominal sternites dark brown; antennae yellow.

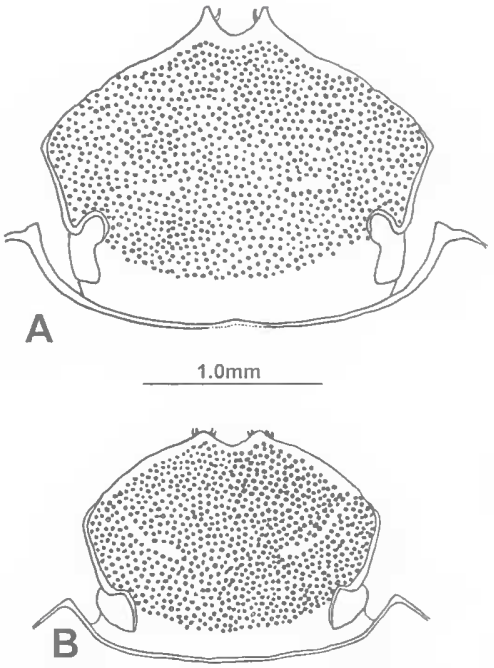

FIG. 4. *Aptenocanthon* spp., head, dorsal view. A, *winyar* sp. nov.; B, *woolumbin* sp. nov.

Head. Clypeal teeth short, apices rounded, U-shaped excavation between, also smaller U-shaped emarginations just lateral to each tooth; rest of margin very feebly convex to genae which are obtuse, rounded; edge finely margined. Dorsal surface nitid, glabrous, with dense, medium-size punctures separated by less than one diameter, reduced near clypeal margin, on clypeal teeth and on small triangular markings central from each eye. Dorsal portion of eyes short about 3 facet rows long, maximum width 6 facet rows; eyes separated by about 6 eye widths. Labial palpi with terminal segment small, cylindrical, about one-half length of second segment.

Pronotum. Slightly flattened; anterior angles quadrate, apices subacute; lateral angles broadly obtuse; posterior angles obtuse; anterior edge finely margined; lateral edge with single margin; posterior edge unmargined. Dorsal surface nitid, glabrous with numerous medium-size punctures, separated by 1-2 diameters, reduced in centre of disc and becoming a row of large ocellate punctures along posterior margin.

Elytron. Dorsal surface nitid with 7 impressed striae, each broad, shallow, strongly catenulate with small punctures; intervals weakly convex, with scattered fine punctures each with a very fine seta, more obvious towards apex. Surface deflexed outside of 7th stria forming a pseudepipleuron about three-quarters length of elytron; its surface finely reticulate with one basal stria near dorsal margin, a second stria near the centre and traces of a third adjacent to epipleuron. Epipleuron finely reticulate, broad, widest near centre, gradually narrowing to apex.

Pygidium. Broad, convex, apex rounded, with strong groove along basal margin and weaker groove near remaining margin, thus enclosing disc. Surface nitid, glabrous with scattered small punctures.

Venter. Prosternum subnitid with large ocellate punctures in posterior half; hypomeral striae absent. Mesosternum broad, nitid with large horseshoe-, or circular-shaped punctures laterally. Metasternum nitid, central portion with fine punctures, posterior margin and lateral wings with medium to large horseshoe-shaped punctures. Abdominal sternites nitid, fifth and sixth visible segments fused in centre half, segments 2-4 with large circular punctures along anterior margins, these also present over entire surface of segment 5/6.

Legs. Inner apical spur of protibiae short, acute; all femora nitid with small finely setate punctures.

Male. Not available.

REMARKS. This species has elytra similar to *A. hopsoni* Carter but has a different shaped anterior margin of the head, wider dorsal portions of the eyes and, like *A. monteithi* Storey and *A. winyar* sp. nov., lacks hypomeral striae on the underside of the prothorax. The species is known only from the summit of Mt Finnigan, an isolated mountain south of Cooktown which has many other endemic species. It appears to be genuinely rare because intensive collecting on several visits has yielded only two specimens, both in pitfall traps set in rainforest at 1050m. The specific name is an Aboriginal word for head, in reference for the unusual shape of the anterior margin of the head.

Aptenocanthon monteithi Storey, 1984
(Figs 6C, 8)

NEW MATERIAL. (40) N Qld: 1♂, Bellenden Ker, Summit TV Station, 1560m, 29.iv.-2.v.1983, GM & DY; 1♂1♀, same data, litter berlesate; 2♀, same locality, 28.viii.- 8.x.1991,GM&HJ, pitfall traps; 2♀, Lambs Head, 10km W Edmonton, 1200m, 8.i.- 22.ii.1990, GM,GT&HJ, rainforest pitfalls; 1♂1♀ same data except 10.xii.1989-

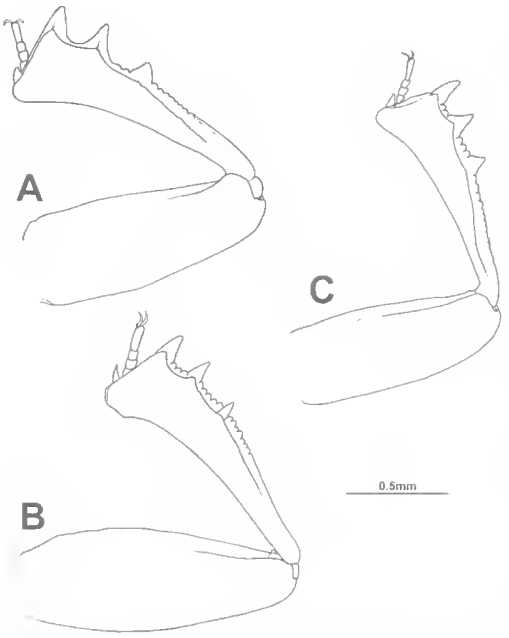

FIG. 5. *Aptenocanthon* spp., male fore legs, dorsal view. A, *speewah* sp. nov.; B, *winyar* sp. nov.; C, *wollumbin* sp. nov.

8.i.1990; 4♂ Lamb Range, 19km SE Mareeba, 1200m, 3.x.1988, GM & GT, litter berlesate and pitfall;1♂1♀, Kauri Ck, Lamb Ra, 1190m, 6-10.ii.1998, GM & DC, fish pitfall; 1♂1♀, Mt Fisher summit, 1360m, 8.ii.1998, GM & DC, litter berlesate; 18♂5♀, Mt Bartle Frere, top camp, 1500m, 29-30.xi.1998, GM, dung trap. In QM, QPIM, HAHC.

REMARKS. These new records do not extend its range beyond the four mountain massifs from which it was originally described. Its altitudinal range is the highest in the genus, not having been recorded below about 1100m.

Aptenocanthon speewah sp. nov.
(Figs 2B, 5A, 6D, 7A, 8)

MATERIAL. HOLOTYPE: ♂, QMT54713, N Qld, 16°55'S 145°40'E, Mt Williams, 900-1000m, 2-3.xii.1993. Cook, Monteith & Janetzki. In QM. PARATYPES: (86) 10♂25♀, same data as holotype; 11♂16♀, same locality, 1000m, 27.xi.1997-6.ii.1998, GM & DC, rainforest pitfall; 1♂, same locality, 28.xi.1997, GM, berlesate ex litter; 13♂10♀, same locality, 27-28.xi.1997, GM & DC, dung trap. In QM, duplicates in ANIC, HAHC, DPIM.

DESCRIPTION. *Male.* Total length 4.0-4.2 mm; maximum width 4.2mm; colour black except head, legs, abdominal sternites dark brown. Antennae yellow.

Head. Clypeal teeth short, blunt, with U-shaped excavation between; rest of margin uniformly convex to genae; edge finely margined. Head surface nitid, glabrous, with numerous punctures separated by 1 diameter or a little less. Dorsal portion of eyes about as wide as long (7 facets), separated by about 10 diameters. Labial palpi with apical segment small, blunt, about half diameter and about two thirds length of second segment.

Pronotum. Weakly convex, ratio of width at base (widest point) to length at middle about 1.7. Anterior angles quadrate, apices weakly protruding; lateral angles broadly obtuse; posterior angles obtuse, subquadrate. Whole perimeter finely margined. Surface nitid, glabrous, covered with medium-size simple punctures, separated by 1-2 diameters, smaller and less dense in centre of disc; punctures effaced along lateral edges.

Elytron. Convex, finely reticulate, with 7 striae on dorsal surface; stria 7 terminating at about half elytral length; striae simple, practically impunctate on disk but with small punctures towards sides, intervals flat, with fine punctures. Pseudipleural carina absent but elytron roundly deflexed outside seventh stria. Epipleuron broad, curved outwards, merging with remnant of stria 8; surface finely reticulate, glabrous, impunctate.

Pygidium. Nitid, smooth, very finely punctate; a deep transverse groove runs parallel to upper margin and terminates in a pit at each end.

Venter. Prosternum reticulate, with a group of obscure ocellate punctures near posterior edge; hypomeral striae present, extending from hind margin about two thirds distance to femoral depressions. Mesosternum nitid, posterior half with sparse ocellate punctures. Metasternum nitid, very finely punctate on central portion with impressed, close-spaced, horseshoe-shaped punctures on lateral wings. Abdominal sternites reticulate, visible segments 5 and 6 semi-fused in centre, segments 2-5 with obscure medium-size punctures laterally on anterior margin, segment 6 with large, scattered punctures over most of surface.

Legs. Fore tibia with inner apical angle produced and bearing a tuft of downward-directed bristles; inner apical spur short, wide, blunt. All femora nitid with very fine punctures, glabrous.

Female. Lacking expanded fore tibial angle and with spur longer, narrow, acute.

REMARKS. This speeies lacks the carinate pseudepipleural fold along the edge of the elytra which is normally typical of *Aptenocanthon*. However the elytra curve from the dorsum to the plane of the pseudepipleural surface at the same point laterad of stria 7. This indieates that absence of the carina is secondary. The southern species, *A. rossi*, has also lost the carinate margin. In other respeets, ineluding the male tibial structure, *A. speewah* accords with *Aptenocanthon*. The speeies is known only from the summit rainforest on Mt Williams, a peak whieh forms the eastern end of the range separating the valleys of the Barron River and Freshwater Creek 10km W of Cairns. Its name eommemorates 'The Speewah', a pioneering name for the district at the northern base of Mt Williams.

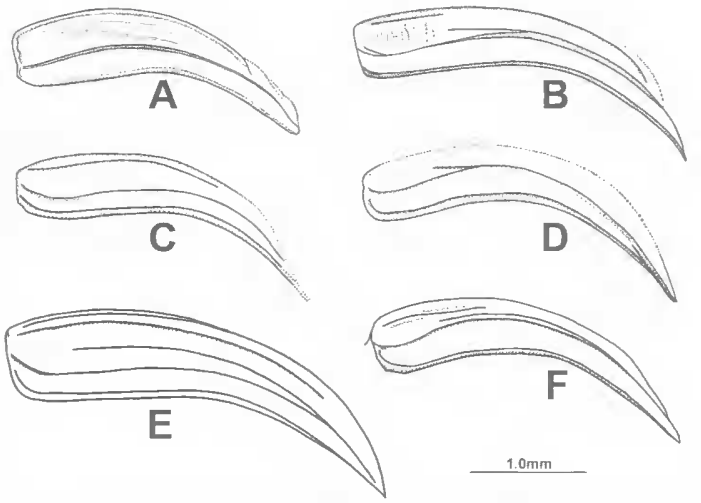

FIG. 6. *Aptenocanthon* spp., epipleural region of left elytron, anterior to left. A, *jimara* sp. nov.; B, *kabura* sp. nov.; C, *monteithi* Storey; D, *speewah* sp. nov.; E, *winyar* sp. nov.; F, *woolombin* sp. nov.

Aptenocanthon winyar sp. nov.
(Figs 2C, 4A, 5B, 6E, 7B, 8)

MATERIAL. HOLOTYPE: ♂, QMT54676. Queensland: 17°23'S 145°47'E, Mt Bartle Frere, Upper Boulder Cave, 1000m, 25.xi.1994, G. Monteith, in swiftlet guano. In QM. PARATYPES: (183) Qld: 7♂ 3♀, same data as holotype; 8♂4♀, same locality except 12.v.1995, GM & D. Slaney; 1♂, same locality except 8.xii.1990, GM, GT, DC & R. Sheridan; 1♀, Mt Bartle Frere, Swiftlet Cave, 900m, 8.xii.1990, GM, GT, DC & R. Sheridan; 5♂3♀, 17°41'S 145°32'E, Vine Creek, Majors Mt, 1060m, 4-6.ii.1999, GM & DC, dung pitfall; 2♂, same data, but fungus pitfall; 1♂, same data, but fish pitfall; 1♂, same locality, 15-18.iv, GM & SM, dung pitfall; 5♂, same data, but fungus pitfall; 8♂3♀, same data, but dead insect pitfall;1♂, Upper Boulder Creek, 850m, 11km NNW of Tully, 15-19.xi.1984, GM, DC & GT; 1♀, same locality, 4.xii.1989, GM, GT & HJ, pitfall, 800m; 1♂ 1♀, 17°54'S 145° 51'E, summit 7km S of Mt Kooroomool, 1050m, 3.xi.1998, GM, dung trap, dusk 5-7.30pm; 9♂17♀, same locality, 3.xii.1999, GM, dung trap, night, 7.30-10pm; 38♂ 33♀, same locality, 3-4.xii.1998, GM, dung trap, night/dawn, 10pm-7.30am; 1♀, same locality, 4.xii.1998, GM, dung trap, dusk, 6-7.30pm; 12♂ 10♀, same locality, 4-5.xii.1998, GM, dung trap, night, 7.30pm-5.30am; 3♂ 1♀, same locality, 3.xii.1998, GM, DC & PB; 1♀, Mt Macalister, Cardwell Range, 850m, 18.xii.1986 - 14.i.1987, GM, GT & SH, RF, pitfall trap. In QM, with duplicates in ANIC, HAHC, QPIM.

DESCRIPTION. Total length 6.2mm; maximum width 4.2; colour brown, disc of elytra darker, antennae yellow.

Male. Head. Clypeal teeth short, subacute, close together, U-shaped excavation between; rest of margin feebly convex to genae, which are obtuse; edge finely margined. Surface nitid, glabrous, with numerous medium-size punctures separated by 0.5-1 diameter; punctures effaced along anterior margin, elypeal teeth and small elyptical marking in front of eyes. Dorsal protions of eyes small, about 8 facet rows in length and width, separated by about 10 eye widths; canthus incomplete. Labial palpi with apical segment small, narrow, cylindrical, about one-third length of seeond segment.

Pronotum. Convex, ratio of width at base (widest point) to length at middle about 2.4. Anterior angles quadrate, apices acute, protruding; lateral angles broadly obtuse; posterior angles obtuse, subquadrate. Antcrior edge finely margined to middle; lateral edge with single margin; posterior edge with fine margin at lateral quarters only. Surface nitid, glabrous, covered with medium-size simple punetures, separated by 0.5-1 diameters, smaller and less dense in centre of disc; punctures effaced along lateral edges, indistinct horseshoe-shaped punctures along posterior margin.

Elytron. Convex, finely retieulate, with 7 striae on dorsal surfaee; striae fine, narrow, with small

Elytron. Subconvex, nitid, glabrous. Seven distinct striae on dorsal surface, these narrow, finely punctate with small punctures, these vaguely crenulating striae near apex. Intervals flat, impunctate. Surface deflexed outside seventh stria forming pseudepipleuron above epipleuron, edge rounded, formed to about three-quarters length of elytron, with 2 short fine striae, surface nitid, glabrous, impunctate. Epipleuron subnitid, glabrous, broad, widest about middle then gradually narrowing to apex.

Pygidium. Convex, nitid, glabrous with scattered minute punctures. Anterior edge with distinct groove along entire length, rest of edge distinctly margined only.

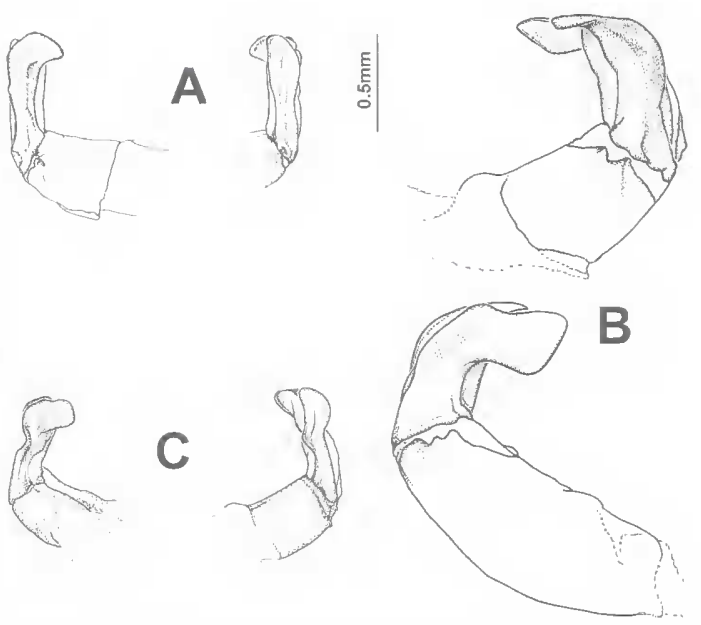

FIG. 7. *Aptenocanthon* spp., apex of aedeagus with parameres, left and right views. A, *speewah* sp. nov.; B, *winyar* sp. nov.; C, *woolumbin* sp. nov.

Venter. Prosternum subnitid, glabrous; hypomeral striae present, running from posterior edge about one-half distance to femoral depressions, area medial of striae with narrow, crescent-shaped punctures. Mesosternum narrow, nitid, glabrous with crescent-shaped punctures on lateral one-thirds. Metasternum nitid, glabrous, centre portion with minute punctures, small and simple punctures along posterior margin, large and horseshoe-shaped on lateral wings. Abdominal sternites subnitid, glabrous, sternites 5 and 6 fused in centre half. Small circular punctures along anterior edges of segments 2-4, segment 5/6 with larger circular or horseshoe-shaped punctures on entire surface.

Legs. Fore tibia with inner apical angle produced and bearing a tuft of downward-directed bristles; spur short, blunt; anterior ventral surface of fore femora with very small punctures and posterior ventral surface with medium-size punctures. Hind tibia with a blunt, inwardly-directed tubercle at the apex. Meso- and metafemora nitid, glabrous with scattered minute punctures.

Male genitalia. As illustrated in Fig. 7C.

Female. As for male but lacking specialisation of fore and hind tibiae.

REMARKS. *A. wollumbin* sp. nov. is known only from an isolated population in the summit rainforest of Mt Elliot (1000-1200m), just southwest of Townsville, Queensland. It is very comon there and was taken using dung-baited pitfalls, unbaited pitfalls and berlesate extraction in rainforest. Unlike *A. monteithi* Storey and *A.winyar* sp. nov. from the Bellenden-Ker Range and Atherton Tablelands further north, *A. wollumbin* has hypomeral carinae on the prothorax, sternites 5 and 6 of the abdomen fused in the centre and a strong basal groove on the pygidium, as do the two NSW species *A. hopsoni* Carter and *A. rossi* Matthews. The specific name is an Aboriginal word for 'high mountain'.

DISTRIBUTION OF WET TROPICS SPECIES

With five of the eight species occurring there, the Wet Tropics is now revealed to be the centre of diversity for a genus initially thought confined to southern Australia. The range of all species is shown in Fig. 8A. All are allopatric and restricted to wet rainforests at altitudes in excess of about 900m. Three are confined to discreet summit zones of single isolated peaks: *A. woolumbin* on Mt Elliot, *A. speewah* on Mt Williams and *A. kabura* on Mt Finnigan. The remaining two, *A. monteithi* and *A. winyar*, have more extensive ranges on the mountain complexes which surround the Atherton Tableland in the central

punctures, intervals very feebly convex, punctate, with fine punctures. Elytron sharply deflexed outside seventh stria forming pseudepipleuron; surface finely reticulate, glabrous, impunctate with 2 strong striae running most of length of pseudepipleuron. Epipleuron broad, constant width for three-quarters length then narrowing to apex; surface finely reticulate, glabrous, impunctate.

Pygidium. Pygidium smooth, nitid, uniformly convex and lacking grooves; surface with scattered small, shallow punctures and some transverse reticulation; a narrow raised margin present all round.

Venter. Prosternum reticulate, with a group of obscure ocellate punctures near posterior edge; hypomeral striae absent. Mesosternum nitid, with posterolateral group of ocellate punctures. Metasternum nitid, very finely punctate on central portion with ocellate punctures on lateral wings. Abdominal sternites reticulate, visible segments 5 and 6 not fused in centre, segments 2-5 with obscure medium-size punctures laterally on anterior margin, segment 6 with scattered obscure medium punctures laterally.

Legs. Fore tibia with inner apical angle produced and bearing a tuft of downward-directed bristles; inner apical spur narrow, acute. All femora nitid with very fine punctures, glabrous.

Male genitalia. As illustrated in Fig. 7B.

Female. As for male but lacking produced inner angle and bristle-tuft; fore tibial spur longer.

REMARKS. *A. winyar* sp. nov. is very close to *A. monteithi* Storey and can be distinguished by its larger size, more distinct elytral striae, more convex elytral intervals and its eye shape. It is the most widespread Wet Tropics species, ranging from Mt Bartle Frere south to the southern end of the Cardwell Range and east to the end of the Walter Hill Range. Both *A. winyar* and *A. monteithi* have been recorded on Mt Bartle Frere, however their habitats do not overlap with *A. monteithi* found only near the summit (above about 1500m) and *A. winyar* much lower (850-1000m).

There is some habitat variation over the range of *A. winyar*. On Mt Bartle Frere it has been taken only in the complete dark zone of deep, underground, erosional boulder caves, up to 20 metres below the surface. There it lives in association with mounds of bird guano which form beneath nesting colonies of the White-rumped Swiftlet (*Collocalia spodiopygius*). Persistant collecting outside the caves has failed to detect it in the epigeal habitat. By contrast, at other sites such as Vine Creek and near Mt Kooroomool it is abundant in the leaf litter and comes in large numbers to exposed baits including dung, carrion, decaying mushroom and dead insect. It is strictly nocturnal in activity.

Aptenocanthon wollumbin sp. nov.
(Figs 2D, 4B, 5C, 6F, 7C, 8)

MATERIAL. HOLOTYPE: ♂, QMT54749, Qld, Mt Elliot NP, NE Qld (Upper North Ck, 1000m), 3-5.xii.1986, G. Monteith, G. Thompson & S. Hamlet, pitfall traps. In QM. PARATYPES: (143) Qld: 36♂ 32♀, same data as holotype; 2♂ 2♀, same data but 2-5.xii.1986; 17♂ 11♀, same data but 25-27.iii.1991, GM & DC, pitfall and dung traps; 1♂ 1♀, same data but 3.xii.1986-15.ii.1987, GM, GT & SH, RF pitfall traps; 2♂ 1♀, same data but 25-27.iii.1991, GM & DC; 1♀, 19°30'S, 146°57'E, Mt Elliot summit area, 1000-1200m, 3.xii.1986, GM, GT & SH; 9♂ 11♀, same locality, 1150m, i.-26.iii.1991, A. Graham, pitfall and intercept traps, fern glade; 2♂, same locality, 13.xii.1990, A. Graham, hand collecting; 3♂ 3♀, same locality, i.-26.iii.1991, A. Graham, pitfall and intercept traps, rainforest; 1♂ 1♀, same locality, 26.iii.-12.v.1991, DC, pitfall and intercept traps, rainforest; 1♂ 1♀, same locality, 1150m, 26.iii.1991, GM & DC; 1♀, same locality, 12.v.1991, DC & D. Beaty; 3♂ 2♀, 19°26'S 146°58'E, Mt Elliot, NE slope, 1000m, 5.xii.1986, GM & GT, QM Berlesate No 723, rainforest litter. In QM, duplicates in ANIC, HAHC, QPIM.

DESCRIPTION. Total length 4.0-4.6mm, maximum width 2.7-3.1mm, colour black, legs dark brown, antennae yellow.

Male. Head. Clypeal teeth small, subacute, shallow U-shaped excavation between; rest of margin feebly convex to obtuse, indistinct genae; anterior edge margined. Dorsal surface nitid, glabrous, covered with medium-size punctures separated by 0.5-1 diameters. Dorsal portion of eye, very small, about 1 facet row in length on frons; width about 3 facet rows; eyes separated by 12-13 eye widths; canthus incomplete. Labial palpi with apical segment cylindrical, narrow, short, about half the length of second segment.

Pronotum. Convex, ratio width (maximum at posterior margin) to length (at centre line) about 1.8. Anterior angles quadrate, subacute, apices feebly protruding, lateral angles obtuse, broadly rounded, posterior angles obtuse, rounded. Anterior edge completely margined, lateral edge with single margin, posterior edge margined in lateral one-quarter only. Surface nitid, glabrous with medium-size punctures separated by 0.5-1 diameters, finer in centre of disc, minute along lateral margins.

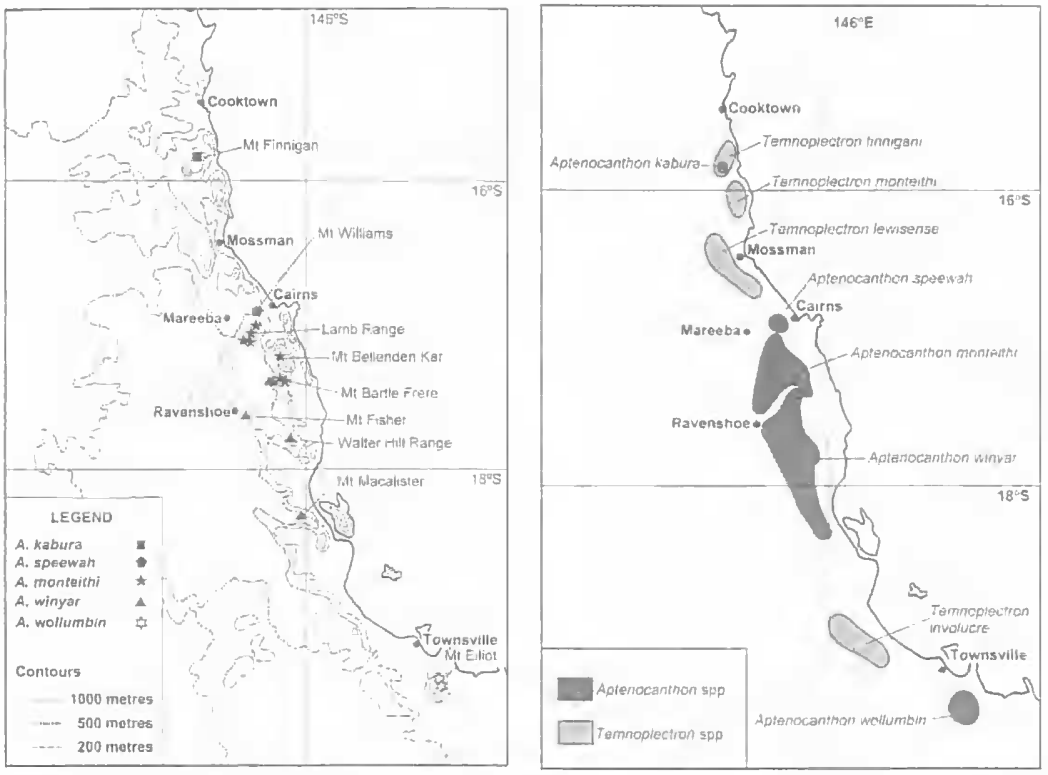

FIG. 8. A, distribution of *Aptenocanthon* spp. in the Wet Tropics region of north Queensland; B, schematic view of distribution of *Aptenocanthon* spp. compared to that of flightless, rainforest species of *Temnoplectron* in the Wet Tropics.

Wet Tropics. Neither occurs on the Tableland itself which, at around 700-800m, is apparently below the altitudinal requirement for the genus.

The absence of *Aptenocanthon* from certain apparently amenable range systems in the Wet Tropics, such as the Paluma Range and the Carbine Tableland, is curious. However comparison with the distribution of ecologically and physically similar flightless species in the genus *Temnoplectron* (Reid & Storey, 2000) indicates that there may be complementarity of distribution of these two taxa operating. There are four species of small, wingless, rainforest *Temnoplectron* in the region: *T. involucre* Matthews from the Paluma Range, *T. lewisense* Reid & Storey from the Carbine Tableland, *T. monteithi* Reid & Storey from the Thornton-Sorrow mountains and *T. finnigani* Reid & Storey on Mt Finnigan and nearby peaks. If the distributions of these are mapped in comparison with *Aptenocanthon* species (Fig. 8B) a clear pattern of mutually exclusive occurrence is revealed. There appears to be a niche available for a small, convex, wingless canthonine dung beetle in high altitude rainforests and this has been filled by one or the other genus on different isolated mountain systems during the climatic and vegetational fluctuations which have occurred over time in the region. The only locality where both *Aptenocanthon* and flightless, rainforest *Temnoplectron* occur together is on the summit of Mt Finnigan. There the abundant *T. finnigani* is sympatric with the extremely rare *A. kabura*. All other Wet Tropics *Aptenocanthon* species are very common in their habits, without competition from flightless *Temnoplectron*. The rareness of *A. kabura* on Mt Finnigan may indicate that it is not competing well with *T. finnigani* and indeed may be only surviving at the highest altitude available in that mountain system.

ACKNOWLEDGEMENTS

We are grateful to Geoff Thompson of the Queensland Museum for preparation of the

figures and maps, other than Fig. 4. The Rainforest CRC and the Wet Tropics Management Authority provided some of the funds for field work.

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